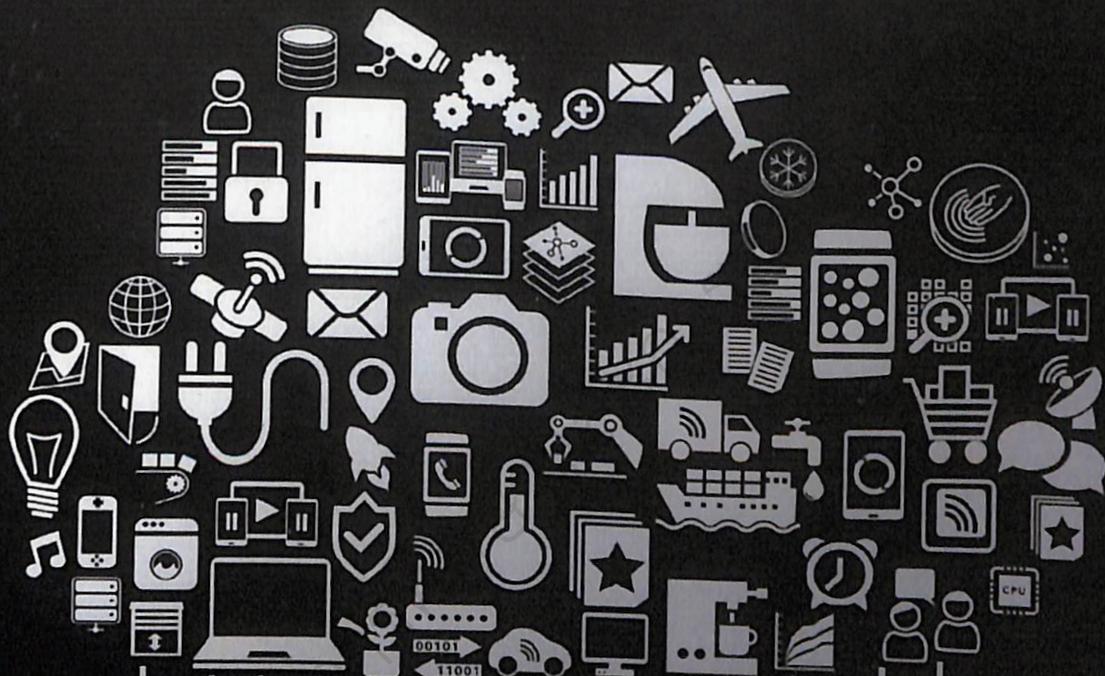


Edited by  
Qusay F. Hassan, Atta ur Rehman Khan,  
and Sajjad A. Madani

# Internet of Things

Challenges, Advances, and Applications



มหาวิทยาลัยเทคโนโลยีราชมงคลพระนคร

ห้องสมุดสาขาพระนครเหนือ



502006139

**CRC** CRC Press  
Taylor & Francis Group

A CHAPMAN & HALL BOOK

---

# Contents

Preface .....	ix
Acknowledgments.....	xiii
Reviewers.....	xv
About the Editors .....	xvii

## ***PART I Concepts and Adoption Challenges***

<b>Chapter 1</b> Introduction to the Internet of Things.....	3
<i>Karolina Baras and Lina M. L. P. Brito</i>	
<b>Chapter 2</b> Organizational Implementation and Management Challenges in the Internet of Things .....	33
<i>Marta Vos</i>	

## ***PART II Technological Advances and Implementation Considerations***

<b>Chapter 3</b> Cooperative Networking Techniques in the IoT Age .....	51
<i>Luigi Alfredo Grieco, Giuseppe Piro, Gennaro Boggia, and Domenico Striccoli</i>	
<b>Chapter 4</b> Exploring Methods of Authentication for the Internet of Things .....	71
<i>Fatemeh Tehranipoor, Nima Karimian, Paul A. Wortman, Asad Haque, Jim Fahrny, and John A. Chandy</i>	
<b>Chapter 5</b> Energy-Efficient Routing Protocols for Ambient Energy Harvesting in the Internet of Things.....	91
<i>Syed Asad Hussain, Muhammad Mohsin Mehdi, and Imran Raza</i>	
<b>Chapter 6</b> IoT Hardware Development Platforms: Past, Present, and Future .....	107
<i>Musa Gwani Samaila, João Bernardo Ferreira Sequeiros, Acácio Filipe Pereira Pinto Correia, Mário Marques Freire, and Pedro Ricardo Morais Inácio</i>	
<b>Chapter 7</b> IoT System Development Methods.....	141
<i>Görkem Giray, Bedir Tekinerdogan, and Eray Tüzün</i>	
<b>Chapter 8</b> Design Considerations for Wireless Power Delivery Using RFID .....	161
<i>Akaa Agbaeze Eteng, Sharul Kamal Abdul Rahim, and Chee Yen Leow</i>	

### **PART III Issues and Novel Solutions**

- Chapter 9** Overcoming Interoperability Barriers in IoT by Utilizing a Use Case-Based Protocol Selection Framework ..... 181  
*Supriya Mitra and Shalaka Shinde*
- Chapter 10** Enabling Cloud-Centric IoT with Publish/Subscribe Systems ..... 195  
*Daniel Happ, Niels Karowski, Thomas Menzel, Vlado Handziski, and Adam Wolisz*
- Chapter 11** The Emergence of Edge-Centric Distributed IoT Analytics Platforms ..... 213  
*Muhammad Habib ur Rehman, Prem Prakash Jayaraman, and Charith Perera*

### **PART IV IoT in Critical Application Domains**

- Chapter 12** The Internet of Things in Electric Distribution Networks: Control Architecture, Communication Infrastructure, and Smart Functionalities ..... 231  
*Qiang Yang, Ali Ehsan, Le Jiang, Hailin Zhao, and Ming Cheng*
- Chapter 13** Satellite-Based Internet of Things Infrastructure for Management of Large-Scale Electric Distribution Networks ..... 253  
*Qiang Yang and Dejian Meng*
- Chapter 14** IoT-Enabled Smart Gas and Water Grids from Communication Protocols to Data Analysis ..... 273  
*Susanna Spinsante, Stefano Squartini, Paola Russo, Adelmo De Santis, Marco Severini, Marco Fagiani, Valentina Di Mattia, and Roberto Minerva*
- Chapter 15** The Internet of Things and e-Health: Remote Patients Monitoring ..... 303  
*Assim Sagahyoon, Raafat Aburukba, and Fadi Aloul*
- Chapter 16** Security Considerations for IoT Support of e-Health Applications ..... 321  
*Daniel Minoli, Kazem Sohraby, Benedict Occhiogrosso, and Jake Kouns*
- Chapter 17** IoT Considerations, Requirements, and Architectures for Insurance Applications ..... 347  
*Daniel Minoli, Benedict Occhiogrosso, Kazem Sohraby, James Gleason, and Jake Kouns*
- Chapter 18** The Internet of Things and the Automotive Industry: A Shift from a Vehicle-Centric to Data-Centric Paradigm ..... 363  
*Zahra Saleh and Steve Cayzer*
- Glossary** ..... 389
- Index** ..... 397
- About the Contributors** ..... 403

# *Part I*

---

## *Concepts and Adoption Challenges*

สำหรับเพื่อการศึกษาและการอ้างอิงเท่านั้น

---

# 1 Introduction to the Internet of Things

*Karolina Baras and Lina M. P. L. Brito*

## CONTENTS

1.1	Introduction .....	3
1.2	Definition of IoT .....	5
1.3	Proposed Architectures and Reference Models.....	8
1.3.1	IoT-A .....	10
1.3.2	IoT RA .....	11
1.3.3	IEEE P2413.....	12
1.3.4	Industrial Reference Architectures.....	12
1.3.5	Other Reference Models and Architectures for IoT .....	14
1.3.5.1	Cisco Reference Model .....	14
1.3.5.2	Reference IoT Layered Architecture.....	15
1.4	Enabling Technologies.....	16
1.4.1	Identification and Discovery .....	16
1.4.2	Communication Patterns and Protocols .....	17
1.4.3	Devices and Test Beds .....	18
1.5	Application Areas: An Overview .....	21
1.5.1	Smart Cities .....	21
1.5.2	Healthcare.....	21
1.5.3	Smart Homes and Smart Buildings .....	23
1.5.4	Mobility and Transportation.....	23
1.5.5	Energy.....	24
1.5.6	Smart Manufacturing.....	24
1.5.7	Smart Agriculture .....	24
1.5.8	Environment/Smart Planet .....	24
1.6	Challenges .....	24
1.6.1	Interoperability .....	25
1.6.2	Openness.....	25
1.6.3	Security, Privacy, and Trust.....	26
1.6.4	Scalability .....	26
1.6.5	Failure Handling.....	27
1.7	Conclusion .....	27
	References.....	28

## 1.1 INTRODUCTION

Back in 1989, there were around 100,000 hosts connected to the Internet (Zakon, 2016), and the World Wide Web (WWW) came to life a year later at CERN with the first and only site at the time.\* Ten years after Tom Berners-Lee unleashed the WWW, a whole new world of possibilities started

---

\* <http://info.cern.ch/>.

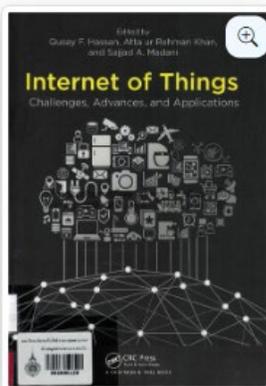
สามารถยืมและติดตามหนังสือใหม่ได้ที่ ระบบห้องสมุดอัตโนมัติ Walai Autolib

<https://lib.rmutp.ac.th/bibitem?bibid=b00108228>

**B** Internet of things : challenges, advances, and applications / edited by Qusay F. Hassan, Atta ur Rehman Khan and Sajjad A. Madani.  
Hassan, Qusay F.

Suggest friends

My list



Subject [Internet of things.](#)

#### Details

Added Author [Khan, Atta ur Rehman](#)  
[Madani, Sajjad A.](#)

Published Boca Raton : CRC Press, c2020.

Edition 1st ed.

Detail xvii, 418 p. : ill. ; 25 cm.

ISBN 9780367572365

2 18 0

MARC

Export

Save

Share

สำหรับการศึกษาระดับปริญญาโทและปริญญาเอก